IN THE CLAIMS

1-20 (Cancelled)

21. (Currently Amended) A method for increasing the depth discrimination of optically imaging systems comprising the steps of:

projecting a periodic structure in the object;

detecting N, N>=3 structured images of the object with phase angles $\varphi_n = n\frac{2\pi}{N}$, $n = 0..N-1$ of the projected structure; and

generating optical sections by evaluation of the images with the N different phase angles by ~~Equation 5b.~~ the equation:

$$I_{sectioned_{xy}} = m_{x,y}' = m_{x,y}\bar{I} = \sqrt{a_{1x,y}^{\;2} + b_{1x,y}^{\;2}}$$

22. (Currently Amended) A method for increasing the depth discrimination of optically imaging systems comprising the steps of:

projecting a periodic structure in the object;

detecting three structured images of the object with the three phase angles 0°, 120°, 240° of the projected structure; and

generating optical sections by evaluation of the three images with different phases by ~~Equation 10.~~ the equation:

$$I_{sectioned_{xy}} = m_{x,y}'$$

$$= \frac{\sqrt{2}}{3}\left\{\sqrt{\left[I_{x,y}(0) - I_{xy}\left(\frac{2\pi}{3}\right)\right]^2 + \left[I_{x,y}(0) - I_{x,y}\left(\frac{4\pi}{3}\right)\right]^2 + \left[I_{x,y}\left(\frac{2\pi}{3}\right) - I_{x,y}\left(\frac{4\pi}{3}\right)\right]^2}\right\}$$

23. (Currently Amended) A method for increasing the depth discrimination of optically imaging systems comprising the steps of:

projecting a periodic structure in the object;

detecting four structured images of the object with the four phase angles 0°, 90°, 180°, 270° of the projected structure; and

generating optical sections by evaluation of the four images with different phases by ~~Equation 11.~~ the equation:

$$I_{sec\,tioned_{xy}} = m_{x,y}' = \frac{1}{2}\sqrt{\left[I_{x,y}(0) - I_{x,y}(\pi)\right]^2 + \left[I_{x,y}\left(\frac{\pi}{2}\right) - I_{x,y}\left(\frac{3\pi}{2}\right)\right]^2}$$

24. (Currently Amended) A method for increasing the depth discrimination of optically imaging systems comprising the steps of:

projecting a periodic structure in the object;

detecting N, N>=3 structured images of the object with phase angles $\varphi_n = n\frac{2\pi}{N}$, $n = 0..N-1$ of the projected structure; and

calculating structure-free images by ~~Equation 7~~, the equation:

$$a_{0x,y} = \bar{I} = \frac{1}{N}\sum_{n=0}^{N-1} I_{x,y}\left(n\frac{2\pi}{N}\right)$$

wherein the image of the object calculated in this way does not have increased depth discrimination.

25. (Currently Amended) A method for increasing the depth discrimination of optically imaging systems comprising the steps of:

projecting a periodic structure in the object;

detecting two structured images of the object with phase angles of 0° and 180°; and

calculating a synthetic image by ~~Equation 12c,~~ the equation:

$$\bar{I}_{x,y} = a_{0x,y} = \frac{1}{2}\left(I_{x,y}(0) + I_{x,y}(\pi)\right)$$

wherein the image of the object calculated in this way does not have increased depth discrimination.

26. (Currently Amended) A method for increasing the depth discrimination of optically imaging systems comprising the steps of:

projecting a periodic structure in the object;

detecting four structured images of the object with phase angles of 0°, 90°, 180°, 270°; and

calculating a synthetic image by ~~Equation 7,~~ the equation:

$$a_{0x,y} = \bar{I} = \frac{1}{N}\sum_{n=0}^{N-1} I_{x,y}\left(n\frac{2\pi}{N}\right)$$

wherein the image of the object calculated in this way does not have increased depth discrimination.

27. (Currently Amended) A method for increasing the depth discrimination of optically imaging systems comprising the steps of:

projecting a periodic structure in the object;

detecting three structured images of the object with phase angles of 0°, 120° and 240°; and

calculating a synthetic image by ~~Equation 12a,~~ the equation:

$$\bar{I}_{x,y} = a_{0x,y} = \frac{1}{3}\left(I_{x,y}(0) + I_{x,y}\left(\frac{2\pi}{3}\right) + I_{x,y}\left(\frac{4\pi}{3}\right)\right)$$

wherein the image of the object calculated in this way does not have increased depth discrimination.

28. (Currently Amended) A method for increasing the depth discrimination of optically imaging systems comprising the steps of:

projecting a periodic structure in the object;

detecting four structured images of the object with phase angles of 0°, 90°, 180°, 270°; and

calculating a synthetic image by ~~Equation 12b,~~ the equation:

$$\bar{I}_{x,y} = a_{0x,y} = \frac{1}{4}\left(I_{x,y}(0) + I_{x,y}\left(\frac{\pi}{2}\right) + I_{x,y}(\pi) + I_{x,y}\left(\frac{3\pi}{2}\right)\right)$$

wherein the image of the object calculated in this way does not have increased depth discrimination.

29. (Previously Presented) The method of claim 21 including using said method in all linear interactions.

30. (Previously Presented) The method of claim 21 including using said method in microscopy.

31. (Previously Presented) The method of claim 21 including using said method in incident light microscopy.

32. (Previously Presented) The method of claim 21 including use in incident brightfield microscopy.

33. (Previously Presented) The method of claim 21 including use in transmitted light microscopy.

34. (Previously Presented) The method of claim 21 including use in incident fluorescence microscopy.

35. (Currently Amended) An arrangement for increasing the depth discrimination of optically imaging systems comprising:

means for projecting a periodic structure in the object;

means for detecting N, N>=3 structured images of the object with phase angles $\varphi_n = n\frac{2\pi}{N}$, $n = 0..N-1$ of the projected structure; and

means for generating optical sections by evaluation of the images with the N different phase angles by ~~Equation 5b.~~ the equation:

$$I_{sectioned_{xy}} = m_{x,y}' = m_{x,y}\bar{I} = \sqrt{a_{1x,y}{}^2 + b_{1x,y}{}^2}$$

36. (Currently Amended) An arrangement for increasing the depth discrimination of optically imaging systems comprising:

means for projecting a periodic structure in the object;

means for detecting three structured images of the object with the three phase angles 0°, 120°, 240° of the projected structure; and

means for generating optical sections by evaluation of the three images with different phases by ~~Equation 10.~~ the equation:

$$I_{sectioned_{xy}} = m_{x,y}'$$

$$= \frac{\sqrt{2}}{3}\left\{\sqrt{\left[I_{x,y}(0) - I_{xy}\left(\frac{2\pi}{3}\right)\right]^2 + \left[I_{x,y}(0) - I_{x,y}\left(\frac{4\pi}{3}\right)\right]^2 + \left[I_{x,y}\left(\frac{2\pi}{3}\right) - I_{x,y}\left(\frac{4\pi}{3}\right)\right]^2}\right\}$$

37. (Currently Amended) An arrangement for increasing the depth discrimination of optically imaging systems comprising:

means for projecting a periodic structure in the object;

means for detecting four structured images of the object with the four phase angles 0°, 90°, 180°, 270° of the projected structure; and

means for generating optical sections by evaluation of the four images with different phases by ~~Equation 11.~~ the equation:

$$I_{sectioned_{xy}} = m_{x,y}' = \frac{1}{2}\sqrt{\left[I_{x,y}(0) - I_{x,y}(\pi)\right]^2 + \left[I_{x,y}\left(\frac{\pi}{2}\right) - I_{x,y}\left(\frac{3\pi}{2}\right)\right]^2}$$

38. (Currently Amended) An arrangement for increasing the depth discrimination of optically imaging systems comprising:

means for projecting a periodic structure in the object;

means for detecting N, N>=3 structured images of the object with phase angles $\varphi_n = n\frac{2\pi}{N}$, $n = 0..N-1$ of the projected structure; and

means for calculating structure-free images by ~~Equation 7,~~ the equation:

$$a_{0x,y} = \bar{I} = \frac{1}{N}\sum_{n=0}^{N-1} I_{x,y}\left(n\frac{2\pi}{N}\right)$$

wherein the image of the object calculated in this way does not have increased depth discrimination.

39. (Currently Amended) An arrangement for increasing the depth discrimination of optically imaging systems comprising:

means for projecting a periodic structure in the object;

means for detecting two structured images of the object with phase angles of 0° and 180°; and

means for calculating a synthetic image by ~~Equation 12c,~~ the equation:

$$\bar{I}_{x,y} = a_{0x,y} = \frac{1}{2}\left(I_{x,y}(0) + I_{x,y}(\pi)\right)$$

wherein the image of the object calculated in this way does not have increased depth discrimination.

40. (Currently Amended) An arrangement for increasing the depth discrimination of optically imaging systems comprising:

means for projecting a periodic structure in the object;

means for detecting four structured images of the object with phase angles of 0°, 90°, 180°, 270°; and

means for calculating a synthetic image by ~~Equation 7,~~ the equation:

$$a_{0x,y} = \bar{I} = \frac{1}{N}\sum_{n=0}^{N-1} I_{x,y}\left(n\frac{2\pi}{N}\right)$$

wherein the image of the object calculated in this way does not have increased depth discrimination.

41. (Currently Amended) An arrangement for increasing the depth discrimination of optically imaging systems comprising:

means for projecting a periodic structure in the object;

means for detecting three structured images of the object with phase angles of 0°, 120° and 240°; and

means for calculating a synthetic image by ~~Equation 12a,~~ the equation:

$$\bar{I}_{x,y} = a_{0x,y} = \frac{1}{3}\left(I_{x,y}(0) + I_{x,y}\left(\frac{2\pi}{3}\right) + I_{x,y}\left(\frac{4\pi}{3}\right)\right)$$

wherein the image of the object calculated in this way does not have increased depth discrimination.

42. (Currently Amended) An arrangement for increasing the depth discrimination of optically imaging systems comprising:

means for projecting a periodic structure in the object;

means for detecting four structured images of the object with phase angles of 0°, 90°, 180°, 270°; and

means for calculating a synthetic image by ~~Equation 12b,~~ the equation:

$$\bar{I}_{x,y} = a_{0x,y} = \frac{1}{4}\left(I_{x,y}(0) + I_{x,y}\left(\frac{\pi}{2}\right) + I_{x,y}(\pi) + I_{x,y}\left(\frac{3\pi}{2}\right)\right)$$

wherein the image of the object calculated in this way does not have increased depth discrimination.

43. (Previously Presented) The arrangement for increasing the depth discrimination of optically imaging systems according to claim 35, wherein the spatial phase of

the projected structure is adjusted by a plane-parallel plate which is rotatable about an axis perpendicular to the optical axis.

44. (Previously Presented) The arrangement according to claim 35, wherein the spatial phase is adjusted by a galvanometer scanner.

45. (Previously Presented) The arrangement according to claim 35, wherein the structure can be move in axial direction in addition.

46. (Previously Presented) The arrangement according to claim 35, wherein the illumination-side tube lens can be moved in axial direction in addition.

47. (Previously Presented) The arrangement according to claim 45 with motor-actuated movement.

48. (Previously Presented) The arrangement according to claim 46 with motor-actuated movement.

49. (Currently Amended) The arrangement according to claim 47 ~~with motor-actuated movement corresponding to Figures 7a, 7b~~ <u>wherein said motor-actuated movement uses a motor controlled eccentric</u>.

50. (Currently Amended) The arrangement according to claim 47 ~~with~~ <u>wherein said</u> motor-actuated movement ~~of an~~ <u>utilizes an</u> optical wedge ~~corresponding to Figure 9~~.

51. (Previously Presented) The arrangement according to claim 35 in combination with the measurement of the light intensity by a light-sensitive detector.

52. (Previously Presented) The arrangement according to claim 51 in combination with the measurement of the light intensity by a light-sensitive detector, wherein a photodiode is used as light-sensitive detector.

53. (Previously Presented) The arrangement according to claim 51, wherein the digitized signal of the light-sensitive detector is used for scaling the image brightness.

54. (Previously Presented) The arrangement according to claim 53, wherein the digitized signal of the light-sensitive detector is used for scaling the image brightness using Equation 17.

55. (Currently Amended) The arrangement according to claim 35, wherein the calculation of depth-discriminated images is obtained by solving the system of equations given by ~~Equations 20, 21 and 22.~~ the equations:

$$I_{x,y}(\varphi_n) = a_{0x,y} + a_{1x,y} \cdot \sin(\varphi_n) + b_{1x,y} \cdot \cos(\varphi_n)$$

$$\sum_{n=0}^{N-1} \left(M_{x,y}(\varphi_n) - I_{x,y}(\varphi_n)\right)^2 \rightarrow \min$$

and

$$\begin{pmatrix} N & \sum_{n=0}^{N-1}\sin(\varphi_n) & \sum_{n=0}^{N-1}\cos(\varphi_n) \\ \sum_{n=0}^{N-1}\sin(\varphi_n) & \sum_{n=0}^{N-1}\sin^2(\varphi_n) & \sum_{n=0}^{N-1}\sin(\varphi_n)\cos(\varphi_n) \\ \sum_{n=0}^{N-1}\cos(\varphi_n) & \sum_{n=0}^{N-1}\sin(\varphi_n)\cos(\varphi_n) & \sum_{n=0}^{N-1}\cos^2(\varphi_n) \end{pmatrix} \bullet \begin{pmatrix} a_{0x,y} \\ a_{1x,y} \\ b_{1x,y} \end{pmatrix} = \begin{pmatrix} \sum_{n=0}^{N-1} M_{x,y}(\varphi_n) \\ \sum_{n=0}^{N-1}\sin(\varphi_n)M_{x,y}(\varphi_n) \\ \sum_{n=0}^{N-1}\cos(\varphi_n)M_{x,y}(\varphi_n) \end{pmatrix}$$

56. (Previously Presented) The arrangement according to claim 35 also including use of an automatic shutter.

57. (Currently Amended) The arrangement according to claim 35 also including use of a shutter ~~according to Figure 5~~.

58. (Currently Amended) The arrangement according to claim 35 also including minimizing artifacts through the use of averaging according to ~~Equation 24.~~ the equation:

$$\overline{I_{\sec tioned_{xy}}} = \frac{I_{\sec tioned_{xy}}\left(0,\frac{2\pi}{3},\frac{4\pi}{3}\right) + I_{\sec tioned_{xy}}\left(\frac{4\pi}{3},\frac{2\pi}{3},0\right)}{2}$$

59. (Currently Amended) The arrangement according to claim 35 also including implementation of a module with two diaphragm apertures. ~~two positions according to Figure 8~~.

60. (Previously Presented) The arrangement according to claim 35 also including the coding of the grating with a bar code for automatic detection of the grating.

61. (Previously Presented) The arrangement according to claim 35 also including the coding of the grating with a stripe code for automatic detection of the grating.

62. (Previously Presented) The arrangement according to claim 35 also including exchangeable gratings.

63. (Previously Presented) The arrangement according to claim 62 wherein the illumination-side tube lens is moved in axial direction in addition.

64. (Previously Presented) The arrangement according to claim 63 with motor-actuated movement.

65. (Currently Amended) The arrangement according to claim ~~63 with motor-actuated movement corresponding to Figures 7a, 7b~~ 64 wherein the motor actuated movement uses a motor controller eccentric.

66. (Currently Amended) The arrangement according to claim ~~63 with motor-actuated movement of an optical wedge corresponding to Figure 9~~ 64 wherein the motor actuated movement uses an optical wedge.

67. (Previously Presented) The arrangement according to claim 63 in combination with the measurement of the light intensity by a light-sensitive detector.

68. (Previously Presented) The arrangement according to claim 67 in combination with the measurement of the light intensity by a light-sensitive detector, wherein a photodiode is used as light-sensitive detector.

69. (Previously Presented) The arrangement according to claim 67, wherein the digitized signal of the light-sensitive detector is used for scaling the image brightness.

70. (Previously Presented) The arrangement according to claim 69, wherein the digitized signal of the light-sensitive detector is used for scaling the image brightness using Equation 17.

71. (Currently Amended). The arrangement according to claim 70, wherein the calculation of depth-discriminated images is obtained by solving the system of equations given by ~~Equations 20, 21 and 22.~~ <u>the equations:</u>

$$I_{x,y}(\varphi_n) = a_{0x,y} + a_{1x,y} \cdot \sin(\varphi_n) + b_{1x,y} \cdot \cos(\varphi_n)$$

$$\sum_{n=0}^{N-1} \left(M_{x,y}(\varphi_n) - I_{x,y}(\varphi_n)\right)^2 \rightarrow \min$$

<u>and</u>

$$\begin{pmatrix} N & \sum_{n=0}^{N-1}\sin(\varphi_n) & \sum_{n=0}^{N-1}\cos(\varphi_n) \\ \sum_{n=0}^{N-1}\sin(\varphi_n) & \sum_{n=0}^{N-1}\sin^2(\varphi_n) & \sum_{n=0}^{N-1}\sin(\varphi_n)\cos(\varphi_n) \\ \sum_{n=0}^{N-1}\cos(\varphi_n) & \sum_{n=0}^{N-1}\sin(\varphi_n)\cos(\varphi_n) & \sum_{n=0}^{N-1}\cos^2(\varphi_n) \end{pmatrix} \bullet \begin{pmatrix} a_{0x,y} \\ a_{1x,y} \\ b_{1x,y} \end{pmatrix} = \begin{pmatrix} \sum_{n=0}^{N-1} M_{x,y}(\varphi_n) \\ \sum_{n=0}^{N-1}\sin(\varphi_n) M_{x,y}(\varphi_n) \\ \sum_{n=0}^{N-1}\cos(\varphi_n) M_{x,y}(\varphi_n) \end{pmatrix}$$